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AMENDMENTS TO THE CLAIMS

1. (Currently amended): An interconnect structure S containing a plurality of nodes and a plurality of interconnects selectively coupling the nodes, the interconnect structure S comprising:

a node set T;

an interconnect set I that selectively connects nodes in the node set T;

a device set A mutually exclusive of the node set T with each device in the device set A sending data to one or more nodes in the node set T;

a device set Z mutually exclusive of the node set T with each device in the device set Z receiving data from one or more nodes in the node set T; and

a collection C of node subsets of the node set T, each node in the node set T being contained in exactly one member of the collection C such that:

for a device x in the device set Z, a sequence  $cx = cx_0, cx_1, cx_2, \dots, cx_U$  exists

with each member of the sequence  $cx$  being a node set in the collection C, the sequence  $cx$  passing data from devices in the device set A to the device x on a plurality of paths, among the plurality of paths being a path set  $P(x)$  characterized in that a path R is included in the path set  $P(x)$  only if each node on the path R is in a member of the sequence  $cx$ , a node of the path R that receives a message directly from a device in the device set A being a member of node set  $cx_U$  and a node of the path R that sends data directly to the device x being a member of node set  $cx_V$  with U being larger than V;

for a member Y of the collection C, a corresponding set of devices  $Z(Y)$  exists in the device set Z such that a device y is included in the set of devices  $Z(Y)$  only if the member Y is also a member of a sequence  $cy$ ;

for members  $cx_H$  and  $cx_K$  of the sequence  $cx$  with  $H > K$ , a device set  $Z(cx_K)$  is a subset of a device set  $Z(cx_H)$ ;

the sequence  $cx$  includes two members  $cx_L$  and  $cx_M$  with  $L > M$  and with a device set  $Z(cx_M)$  being a subset of a device set  $Z(cx_L)$  and a device exists in the device set  $Z(cx_L)$  that is not included in the device set  $Z(cx_M)$ ; and

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the node set  $T$  includes three distinct nodes  $p$ ,  $q$ , and  $r$ , the node  $p$  being in a member  $cx_D$  of the sequence  $cx$ , the nodes  $q$  and  $r$  being in a member  $cx_E$  of the sequence  $cx$  with  $D > E$ , in one path of the plurality of paths  $P(x)$  a message moves directly from the node  $p$  to the node  $r$  and in another path of the plurality of paths  $P(x)$  a message moves directly from the node  $q$  to the node  $r$ .

2. (Original): An interconnect structure according to Claim 1 wherein: the plurality of paths of the sequence  $cx$  include a path such that if a message hops from a node in a member  $cx_n$  to a node in a member  $cx_m$ , then  $n > m$ .

3. (Previously presented): An interconnect structure according to Claim 1 further comprising:

an arrangement of the nodes in the interconnect structure into a hierarchy of levels of node sets  $LV = LV_0, LV_1, \dots, LV_J$ , each member of the hierarchy  $LV$  being a node set that is subset of the node set  $T$  and each node in the node set  $T$  is contained in exactly one member of the node sets  $LV$ ; and for the device  $x$  of the device set  $Z$ , a node set  $cx_N$  is a subset of a level  $N$  node set  $L_N$ , with  $N$  not exceeding  $J$ .

4. (Previously presented): An interconnect structure according to Claim 3 wherein:

the collection  $C$  includes  $2^{J-N}$  members on a level  $N$ ;

the collection  $C$  includes three members  $D$ ,  $E$  and  $F$  such that member node set  $D$  is on a level  $LV_N$  and member node sets  $E$  and  $F$  are on a level  $LV_{N+1}$ ;

the interconnect set  $I$  includes interconnects positioned to allow data to pass directly from the member node set  $D$  to the member node set  $E$  and to pass directly from the node set  $D$  to the node set  $F$ ; and

the device set  $Z$  includes device sets  $Z(D)$ ,  $Z(E)$ , and  $Z(F)$  that correspond to the three members  $D$ ,  $E$ , and  $F$ , the device sets  $Z(E)$  and  $Z(F)$  being mutually exclusive device sets, and the device set  $Z(D)$  is the union of the device sets  $Z(E)$  and  $Z(F)$ .

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5. (Previously presented): An interconnect structure according to Claim 1 further comprising:

a logic  $L_p$  associated with the node  $p$  wherein for a message  $M_p$  that arrives at the node  $p$ , the logic  $L_p$  uses information concerning the sending of messages from the node  $q$  for the logic  $L_p$  to determine where the node  $p$  is to send the message  $M_p$ .

6. (Previously presented): An interconnect structure according to Claim 1 wherein:

the node  $q$  has priority over the node  $p$  to send data to the node  $r$  so that a message  $M_q$  located at the node  $q$  is not blocked from being sent to the node  $r$  by a message  $M_p$  at the node  $p$ ; and

the node  $q$  sends a control signal to the node  $p$  wherein the purpose of the control signal is to enforce the priority of the node  $q$  over the node  $p$  to send data to the node  $r$ .

7. (Previously presented): An interconnect structure according to Claim 1 wherein:

the node set  $T$  includes a node  $s$  distinct from the nodes  $p$ ,  $q$ , and  $r$ , the node  $s$  being in the member  $cx_D$ , so that in one path of the plurality of paths  $P(x)$ , a message moves from the node  $p$  directly to the node  $s$ .

8-13. (Canceled).

14. (Previously presented): An interconnect structure comprising:  
a plurality of nodes including a node  $N_E$  and a node set  $P$ , the node set  $P$  including a plurality of nodes that send data to the node  $N_E$ ; and

a plurality of interconnect paths interconnecting the plurality of nodes, the interconnect paths including data interconnect paths that couple nodes in pairs, a node pair including a sending node and a receiving node, the sending node sending data to the receiving node;

the nodes in the node set  $P$  having a priority relationship for sending data to the node  $N_E$ , the nodes in the node set  $P$  including distinct nodes  $N_F$  and  $N_A$ , the node  $N_F$  having a highest priority among the nodes in the node set  $P$  for

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sending data to the node  $N_E$  so that a message  $M_F$  arriving at the node  $N_F$  is not blocked from traveling to the node  $N_E$  by a message  $M_A$  arriving at the node  $N_A$ ; and

for a message  $M$  arriving at the node  $N_A$  and the message  $M$  is blocked from being sent to the node  $N_E$ , then the blocking of the message  $M$  from being sent to the node  $N_E$  causes sending of the message  $M$  from the node  $N_A$  to a node distinct from the node  $N_E$ , wherein:

when a message  $M$  arrives at the node  $N_A$  and is targeted for the node  $N_E$  and not blocked by a message  $M'$  arriving at a node in the node set  $P$  having a higher priority than the node  $N_A$  for sending messages to the node  $N_E$ , the node  $N_A$  sends the message  $M$  to the node  $N_E$ .

15-23. (Canceled).

24. (Previously presented): An interconnect structure  $S$  containing a plurality of nodes and a plurality of interconnects selectively coupling the nodes, the interconnect structure comprising:

a node set  $T$ ;

an interconnect set  $I$  that selectively connects nodes in the node set  $T$ ;

a device set  $A$  mutually exclusive with the node set  $T$  with each device in the device set  $A$  sending data to a node in the node set  $T$ ;

a device set  $Z$  mutually exclusive with the node set  $T$  with each device in the device set  $Z$  receiving data from a node in the node set  $T$ ;

a set of data paths  $P$ , each path of the path set  $P$  carrying data from a device in the device set  $A$  to a device in the device set  $Z$ , each node on the path of the path set  $P$  is included in the node set  $T$ , and each interconnect in the path is included in the interconnect set  $I$ ;

a node set  $U$  characterized as the set of nodes within the node set  $T$  that are on a path included in the path set  $P$ ;

for a node  $N$  in the node set  $T$  such that the node  $N$  is on a path in the path set  $P$ , a corresponding set of devices  $Z(N)$  exists in the device set  $Z$  such that a device  $w$  is included in the device set  $Z(N)$  only if a path exists in the path set  $P$  from a member of the device set  $A$  to the device  $w$  such that the path contains the node  $N$ ;

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the node set  $U$  includes three distinct nodes  $N_A$ ,  $N_D$ , and  $N_E$  such that the node  $N_A$  sends data to the node  $N_D$  and the node  $N_E$ , and a device set  $Z(N_A)$  is the same as a device set  $Z(N_D)$ , and a device set  $Z(N_E)$  is a proper subset of the device set  $Z(N_A)$ ;

an interconnect link  $IL$  in interconnect set  $I$ , the interconnect link  $IL$  being an interconnect link on a path in the path set  $P$  such that a corresponding set of devices  $Z(IL)$  exists in the device set  $Z$  such that a device  $w$  is included in the device set  $Z(IL)$  only if a path containing the interconnect link  $IL$  in the path set  $P$  exists from a device in the device set  $A$  to the device  $w$ ; and

the node set  $U$  includes distinct nodes  $N_A$ ,  $N_D$ , and  $N_E$  such that the node  $N_A$  sends data to the node  $N_D$  on a link  $L_{AD}$ , the node  $N_A$  sends data to the node  $N_E$  on a link  $L_{AE}$ , and a device set  $Z(L_{AE})$  is a proper subset of a device subset  $Z(L_{AD})$ .

25-35. (Canceled).

36. (Previously presented): An interconnect structure  $S$  comprising:
- a plurality of nodes including nodes  $N_A$ ,  $N_D$ , and  $N_E$ ;
  - a plurality of interconnect lines selectively coupling the nodes in the structure  $S$ ;
  - a plurality of devices in a device set  $I$  that is mutually exclusive of the plurality of nodes, the devices in the device set  $I$  sending data to one or more of the plurality of nodes; and
  - a plurality of devices in a device set  $Z$  that is mutually exclusive of the plurality of nodes, the devices in the device set  $Z$  receiving data from one or more of the plurality of nodes, the device set  $Z$  comprising a plurality of device subsets further comprising:
    - a device subset  $T_A$  consisting of devices  $t_A$  such that a message can be sent from a device in the device set  $I$  through the node  $N_A$  to the devices  $t_A$ ;
    - a device subset  $T_D$  consisting of devices  $t_D$  such that a message can be sent from a device in the device set  $I$  through the node  $N_D$  to the devices  $t_D$ ; and

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a device subset  $T_E$  consisting of devices  $t_E$  such that a message can be sent from a device in the device set  $I$  through the node  $N_E$  to the devices  $t_E$ ;

wherein:

the node  $N_A$  sends data to the node  $N_D$ ;

the node  $N_A$  sends data to the node  $N_E$ ;

the devices in the device subset  $T_A$  are included in the device subset  $T_D$ ; and

a device  $t_A$  exists that is included in the device subset  $T_A$  and excluded from the device subset  $T_E$ .

37. (Previously presented): An interconnect structure  $S$  according to Claim 36 further comprising:

a logic  $L$  that controls passage of messages sent through the interconnect structure  $S$ , wherein:

a plurality of messages  $P$  can be sent to a plurality of nodes from a plurality of devices in the device set  $I$ ;

the plurality of messages  $P$  includes a message  $M_A$  having a target device in the device subset  $T_A$ ; and

the logic  $L$  routes the message  $M_A$  through the node  $N_A$  to a device in the device subset  $T_A$ .

38. (Previously presented): An interconnect structure  $S$  according to Claim 37 wherein:

the message  $M_A$  has a header; and

the logic  $L$  routes the message  $M_A$  through the interconnect structure  $S$  using information in the header of the message  $M_A$ .

39. (Currently amended): An interconnect structure  $S$  according to Claim 36 wherein:

the logic  $L$  is distributed among one or more nodes of the plurality of nodes;

the plurality of nodes includes a node  $N$ ; and

logic of the logic  $L$  associated with the node  $N$  uses control signals to route messages through the node  $N$ .

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40. (Previously presented): An interconnect structure S containing a plurality of nodes and a plurality of interconnects selectively coupling the nodes, the interconnect structure S comprising:

- a node set T including three distinct nodes  $N_A$ ,  $N_D$ , and  $N_E$ ;
- a device set I mutually exclusive of the node set T and containing devices that send data to at least one node in the node set T;
- a device set Z mutually exclusive of the node set T and containing devices that receive data from at least one node in the node set T;
- a plurality of paths P that carry data through the interconnect structure S to devices in the device set Z;
- a device subset  $T_A$  exists such that a message can be sent on a path in the paths P from a device in the device set I through the node  $N_A$  to a device in the device subset  $T_A$ ;
- a device subset  $T_D$  exists such that a message can be sent on a path in the paths P from a device in the device set I through the node  $N_D$  to a device in the device subset  $T_D$ ;
- a device subset  $T_E$  exists such that a message can be sent on a path in the paths P from a device in the device set I through the node  $N_E$  to a device in the device subset  $T_E$ ;

wherein:

- the node  $N_A$  sends data to the node  $N_D$  along a path in the paths P;
- the node  $N_A$  sends data to the node  $N_E$  along a path in the paths P;
- the devices in the device subset  $T_A$  are included in the device subset  $T_D$ ;
- and
- a device exists that is included in the device subset  $T_A$  that is not included in the device subset  $T_E$ .

41. (Original): An interconnect structure S according to Claim 40 further comprising:

- a logic  $L_A$  associated with the node  $N_A$  controls data flow from the node  $N_A$ .

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42. (Previously presented): An interconnect structure S containing a plurality of nodes and a plurality of interconnects selectively coupling the nodes, the interconnect structure S comprising:

- a node set T including three distinct nodes  $N_A$ ,  $N_C$ , and  $N_E$ ;
- a device set I mutually exclusive of the node set T and containing devices that send data to at least one node in the node set T;
- a device set Z mutually exclusive of the node set T and containing devices that receive data from at least one node in the node set T;
- a plurality of paths P that carry data through the interconnect structure S to devices in the device set Z;
- a device subset  $T_A$  exists such that a message can be sent on a path in the paths P from a device in the device set I through the node  $N_A$  to a device in the device subset  $T_A$ ;
- a device subset  $T_C$  exists such that a message can be sent on a path in the paths P from a device in the device set I through the node  $N_C$  to a device in the device subset  $T_C$ ;
- a device subset  $T_E$  exists such that a message can be sent on a path in the paths P from a device in the device set I through the node  $N_E$  to a device in the device subset  $T_E$ ;

wherein:

- the node  $N_C$  sends data to the node  $N_E$  along a path in the paths P;
- the node  $N_A$  sends data to the node  $N_E$  along a path in the paths P;
- the devices in the device subset  $T_C$  are included in the device subset  $T_E$ ; and
- a device exists that is included in the device subset  $T_A$  that is not included in the device subset  $T_E$ .

43. (Original): An interconnect structure S according to Claim 42 further comprising:

- a logic  $L_A$  associated with the node  $N_A$  controls data flow from the node  $N_A$ .

44. (Original): An interconnect structure S according to Claim 43 wherein: a message M arriving at the node  $N_A$  has a header and the logic  $L_A$  uses information in the header to decide where to send the message M.

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45. (Original): An interconnect structure S according to Claim 43 wherein:  
the logic  $L_A$  uses information from the node  $N_C$  to decide where to send the  
message M.

46-70. (Canceled).

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